

Claims:

1. A method for making a field emission display comprising the following steps:
providing a substrate;
forming cathode electrodes on the substrate, the cathode electrodes together with the substrate defining a pixel pattern;
forming a barrier array;
forming gate electrodes on the barrier array;
fixing the barrier array with the gate electrodes to the substrate; and
packaging a phosphor screen with the substrate,
wherein the barrier array is formed by depositing an insulative layer on a shadow mask which defines a plurality of openings according to the pixel pattern of the field emission display.
2. The method for making a field emission display as described in claim 1, wherein the substrate can be glass, ceramic, silicon oxide, alumina or another suitable insulative material having a surface with a total thickness variation less than 1 micrometer.
3. The method for making a field emission display as described in claim 1, wherein the method further comprises the step of providing a mask having a pattern according to the pixel pattern.
4. The method for making a field emission display as described in claim 1, wherein the shadow mask is made from a material selected from the group: invar, low carbon steel, or another suitable metal alloy, and the material has a coefficient of thermal expansion matching that of the substrate.

5. The method for making a field emission display as described in claim 1, wherein the insulative layer comprises alumina or magnesia.
6. The method for making a field emission display as described in claim 5, wherein a thickness of the insulative layer is in the range from 10 to 500 micrometers.
7. The method for making a field emission display as described in claim 5, wherein the insulative layer is formed on the shadow mask by spray coating.
8. The method for making a field emission display as described in claim 5, wherein the insulative layer is formed on the shadow mask by electrophoretic deposition.
9. The method for making a field emission display as described in claim 8, wherein, after the insulative layer has been deposited on the shadow mask, the barrier array is preferably soaked in a solution for a predetermined time to clean surfaces of the barrier array.
10. The method for making a field emission display as described in claim 1, wherein the gate electrodes are formed on the barrier array by electron beam evaporation, thermal evaporation or sputtering.
11. The method for making a field emission display as described in claim 1, wherein the method further comprises a step of attaching the barrier array to a frame having a fixing surface.
12. The method for making a field emission display as described in claim 1, wherein the barrier array with the gate electrodes formed thereon is fixed to the substrate by means selected from fusing powdered glass having a low melting point, welding or employing suitable clips.

13. The method for making a field emission display as described in claim 1, wherein emitters employed by the field emission display comprise carbon nanotubes or metal microtips.
14. A method for making a field emission display comprising the following steps:
 - providing a substrate;
 - forming cathode electrodes on the substrate, the cathodes electrodes together with the substrate defining a pixel pattern;
 - providing a metal plate defining a plurality of openings according to the pixel pattern with an insulative layer formed thereon;
 - forming gate electrodes on the insulative layer;
 - fixing the metal plate with the insulative layer formed thereon to the substrate;
 - and
 - packaging a phosphor screen with the substrate.
15. The method for making a field emission display as described in claim 14, wherein emitters employed by the field emission display comprise carbon nanotubes or metal microtips.
16. The method for making a field emission display as described in claim 14, wherein the metal plate is selected from the group: invar, low carbon steel, or other suitable metal alloys, and the metal plate has a thermal expansion coefficient matching that of the substrate.
17. The method for making a field emission display as described in claim 14, wherein the metal plate with the insulative layer formed thereon is fixed to the substrate by means selected from fusing powdered glass having a low melting point, welding or employing suitable clips.

18. A field emission display comprising:

a substrate;

cathode electrodes disposed upon the substrate and defining a pixel pattern;

carbon nanotubes growing from said cathode electrodes;

a barrier disposed upon the substrate and defining through openings corresponding to said pixel pattern;

gate electrodes located on said barrier and beside said carbon nanotubes; and

anode electrode located above tips of said carbon nanotubes.